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Prepared for

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NATIONAL EUTROPHICATION SURVEY

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REPORT

ON

WATEREE LAKE

FAIRFIELD, KERSHAW, AND LANCASTER COUNTIES

SOUTH CAROLINA

EPA REGION IV

WORKING PAPER NO. 440

WITH THE COOPERATION OF THE

SOUTH CAROLINA DEPARTMENT OF HEALTH AND

ENVIRONMENTAL CONTROL

AND THE

SOUTH CAROLINA NATIONAL GUARD

JUNE, 1975

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16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's freshwater lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the South Carolina Department of Health and Environmental Control for professional involvement, to the South Carolina National Guard for conducting the tributary sampling phase of the Survey, and to those South Carolina wastewater treatment plant operators who voluntarily provided effluent samples and flow data.

The staff of the South Carolina Bureau of Wastewater and Stream Quality Control provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

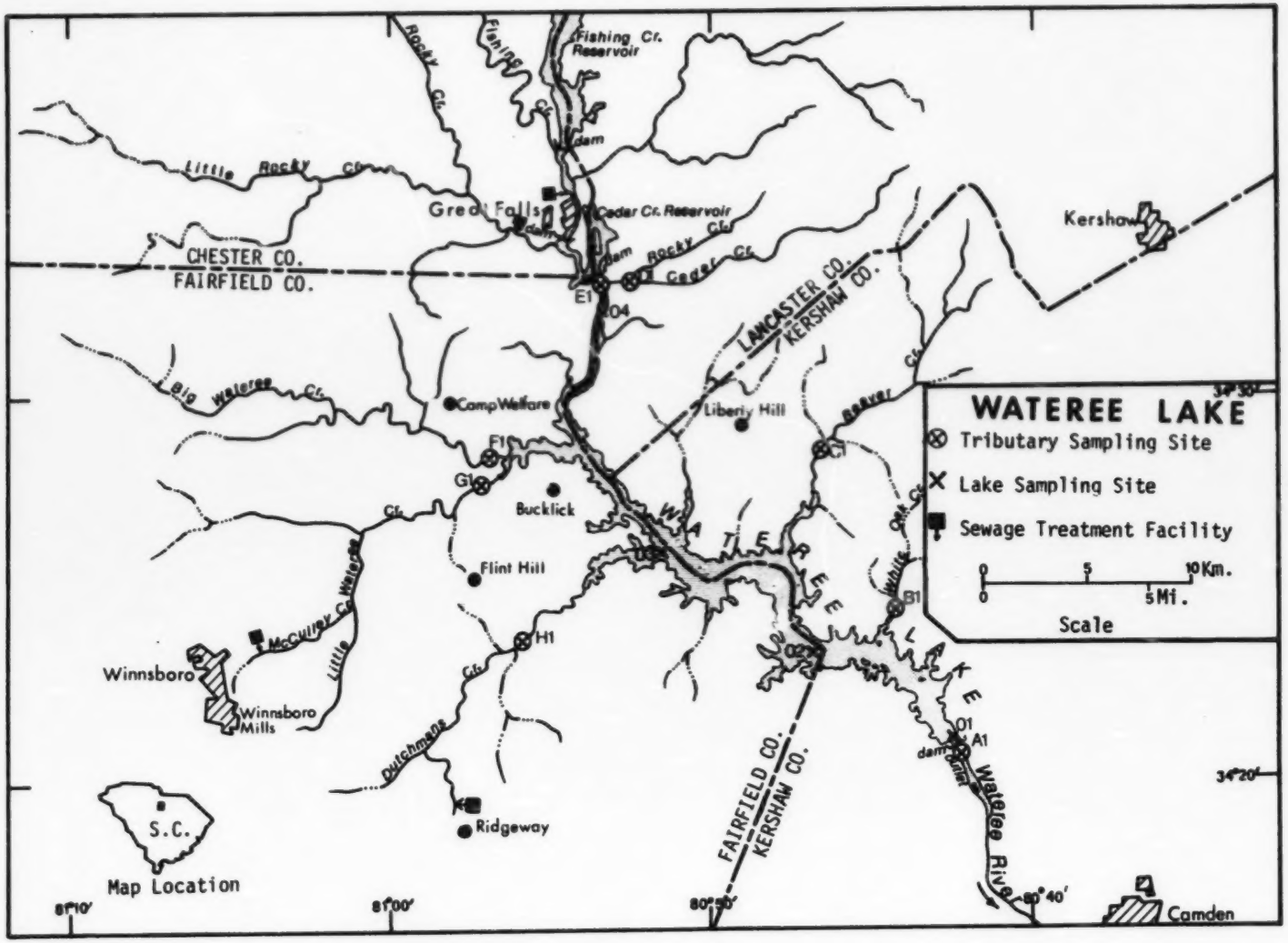
Major General Robert L. McCrady, the Adjutant General of South Carolina, and Project Officer Lt. Colonel John P. DuPre (Retired), who directed the volunteer efforts of the South Carolina National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF SOUTH CAROLINA

NAME	COUNTY
Clark Hill	Abbeville, McCormick, SC; Columbia, Elbert, Lincoln, McDuffie, Wilks, GA
Fishing Creek	Chester, Lancaster
Greenwood	Greenwood, Laurens, Newberry
Hartwell	Anderson, Oconee, Pickens, SC; Franklin, Hart, Stephens, GA
Keowee	Oconee, Pickens
Marion	Berkeley, Calhoun, Claredon, Orangeburg, Sumter
Moultrie	Berkeley
Murray	Lexington, Newberry, Richland, Saluda
Robinson	Chesterfield, Darlington
Saluda	Greenville, Pickens
Secession	Abbeville, Anderson
Wateree	Fairfield, Kershaw, Lancaster
William C. Bowen	Spartanburg
Wylie	York, SC; Gaston, Mecklenburg, NC


WATEREE LAKE
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
0 5 10 Km.
0 5 Mi.
Scale
Fishing Cr. Reservoir
Rocky Cr.
Fishing Cr.
dam
Little Rocky Cr.
Great Falls
Cedar Cr. Reservoir
Rocky Cr.
Cedar Cr.
CHESTER CO.
FAIRFIELD CO.
E1
O4
LANCASTER CO.
KERSHAW CO.
Kershaw
Big Wateree Cr.
Camp Welfare
Liberty Hill
Beaver Cr.
F1
G1
Bucklick
C1
Flint Hill
WATEREE LAKE
White Oak Cr.
B1
McCulley Cr.
Little Wateree Cr.
H1
Winnsboro
Winnsboro Mills
Dutchmans Cr.
O2
O1
A1
dam
Wateree River
FAIRFIELD CO.
KERSHAW CO.
Ridgeway
S.C.
Map Location
Camden
34°30'
34°20'
81°10'
81°00'
80°50'
80°40'

WATEREE LAKE

STORET NO. 4510

I. CONCLUSIONS

A. Trophic Condition:

Survey data indicate Wateree Lake is eutrophic. It ranked last in overall trophic quality when the 13 South Carolina lakes sampled in 1973 were compared using a combination of six parameters*. Eleven of the other lakes had less median total phosphorus and dissolved orthophosphorus, ten had less median inorganic nitrogen, eight had less mean chlorophyll a, and ten had greater mean Secchi disc transparency. Marked depression of dissolved oxygen with depth occurred at sampling stations 1 and 2 in July and at station 1 in September.

Survey limnologists did not observe any macrophytes or surface concentrations of algae during sampling visits.

B. Rate-Limiting Nutrient:

There was a significant loss of nutrients in the assay sample from the time of collection to the time the assay was begun, and the results are not considered representative of conditions in the lake at the time the sample was taken (03/30/73).

The lake data indicate phosphorus limitation in March and July and nitrogen limitation in September.

C. Nutrient Controllability:

1. Point sources--The phosphorus contributions of point-sources

* See Appendix A.

amounted to an estimated 81.7% of the total load reaching Wateree Lake during the sampling year. The municipal wastewater treatment plants within the lake drainage collectively contributed 1.9% of the total load.

The indirect municipal sources discharging in the upstream Catawba River drainage accounted for an estimated 79.7% of the load. This may be an overestimate to some degree because of the possibility of some phosphorus entrapment in the two small reservoirs between the outlet of Fishing Creek Reservoir* and the inlet of Wateree Lake (see map, page v). However, the hydraulic retention times of these reservoirs are certain to be much less than the 6-day retention time of Fishing Creek Reservoir in which only 8.5% of the total phosphorus input was retained during the sampling year.

The phosphorus loading of 11.13 g/m^2 measured during the sampling year is six times that proposed by Vollenweider (Vollenweider and Dillon, 1974) as a eutrophic loading (see page 15). However, the mean hydraulic retention time of Wateree Lake is a relatively short 27 days, and Vollenweider's model may not be applicable.

It is calculated that 85% phosphorus removal at the direct and indirect municipal point sources considered in this report would reduce the loading to 3.4 $g/m^2/yr$. While this is still nearly twice the eutrophic loading, it is likely that the reduced loading would result in persistent phosphorus limitation of primary productivity

* See Working Paper No. 430.

and at least some improvement in the trophic condition of Wateree Lake. Point-source control would reduce the phosphorus loading to downstream Lake Marion* as well.

2. Non-point sources--The Catawba River phosphorus load amounted to 15.7% of the total. The other six gaged tributaries collectively contributed 1.5% of the total load, and the minor tributaries and immediate drainage contributed an estimated 1.1%.

The phosphorus export rates of Big Wateree and Cedar creeks were somewhat higher than the rates of the other tributaries of Wateree Lake (see page 14). However, no known point sources impact either stream, and the higher exports appear to be the result of differing land-use practices in the two drainages.

* Working Paper No. 434.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS†

A. Lake Morphometry††:

1. Surface area: 55.48 kilometers^2.
2. Mean depth: 6.9 meters.
3. Maximum depth: >19.5 meters.
4. Volume: 382.280 x 10^6 m^3.
5. Mean hydraulic retention time: 27 days.

B. Tributary and Outlet:
(See Appendix C for flow data)

1. Tributaries -

Name	Drainage area (km^2)*	Mean flow (m^3/sec)*
Catawba River	11,292.4	150.25
White Oak Creek	33.7	0.38
Beaver Creek	101.8	1.16
Cedar Creek	83.1	0.95
Big Wateree Creek	146.9	1.68
Little Wateree Creek	176.6	2.02
Dutchmans Creek	70.7	0.81
Minor tributaries & immediate drainage -	341.8	3.90
Totals	12,247.0	161.15

2. Outlet -

Wateree River	12,302.5**	161.15**

C. Precipitation***:

1. Year of sampling: 125.2 centimeters.
2. Mean annual: 122.6 centimeters.

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† Table of metric conversions--Appendix B.
†† Martin and Hanson, 1966.
* For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".
** Includes area of lake; outflow adjusted to equal sum of inflows.
*** See Working Paper No. 175.

III. LAKE WATER QUALITY SUMMARY

Wateree Lake was sampled three times during the open-water season of 1973 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from a number of depths at four stations on the lake (see map, page v). During each visit, a single depth-integrated (4.6 m or near bottom to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the first visit, a single 18.9-liter depth-integrated sample was composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 19.5 meters at station 1, 9.1 meters at station 2, 6.1 meters at station 3, and 3.0 meters at station 4.

The sampling results are presented in full in Appendix D and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR LAKE WATEREE
STORET CODE 4510

PARAMETER	1ST SAMPLING (3/30/73) 4 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (7/ 6/73) 4 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (9/21/73) 4 SITES RANGE	MEAN	MEDIAN
TEMP (C)	13.4 - 15.1	14.3	14.4	23.5 - 30.9	27.9	28.4	25.8 - 27.8	26.6	26.5
DISS OXY (MG/L)	7.6 - 11.0	8.5	8.4	0.9 - 9.5	4.7	3.8	1.8 - 9.2	5.3	5.2
CNDCTVY (MCROMO)	90. - 100.	92.	90.	85. - 110.	99.	100.	100. - 113.	106.	108.
PH (STAND UNITS)	7.0 - 7.3	7.2	7.2	6.5 - 9.2	7.3	6.9	6.6 - 9.0	7.0	6.8
TOT ALK (MG/L)	10. - 35.	17.	16.	15. - 25.	21.	21.	17. - 23.	20.	19.
TOT P (MG/L)	0.092 - 0.128	0.112	0.111	0.045 - 0.125	0.086	0.088	0.032 - 0.144	0.059	0.047
ORTHO P (MG/L)	0.034 - 0.043	0.040	0.040	0.007 - 0.047	0.026	0.028	0.015 - 0.052	0.029	0.027
NO2+NO3 (MG/L)	0.360 - 0.480	0.392	0.380	0.070 - 0.330	0.199	0.210	0.040 - 0.230	0.160	0.180
AMMONIA (MG/L)	0.150 - 0.190	0.168	0.160	0.060 - 0.480	0.174	0.140	0.060 - 0.250	0.149	0.140
KJEL N (MG/L)	0.300 - 0.800	0.465	0.400	0.200 - 0.800	0.459	0.500	0.600 - 1.600	0.815	0.700
INORG N (MG/L)	0.520 - 0.670	0.560	0.550	0.140 - 0.700	0.373	0.380	0.110 - 0.440	0.309	0.300
TOTAL N (MG/L)	0.680 - 1.270	0.857	0.790	0.360 - 1.020	0.658	0.650	0.720 - 1.640	0.975	0.890
CHLRPYL A (UG/L)	2.3 - 6.2	3.7	3.2	6.5 - 10.6	9.1	9.6	9.6 - 16.5	12.4	11.6
SECCHI (METERS)	0.3 - 0.5	0.4	0.3	0.3 - 0.9	0.7	0.8	0.5 - 0.9	0.8	0.8

B. Biological Characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
03/30/73	1. *Melosira sp.*	627
	2. *Cryptomonas sp.*	341
	3. Flagellates	286
	4. *Dactylococcopsis sp.*	231
	5. *Cyclotella sp.*	176
	Other genera	903
	Total	2,564
07/06/73	1. *Melosira sp.*	1,163
	2. *Merismopedia sp.*	658
	3. *Nitzschia sp.*	607
	4. *Oscillatoria sp.*	607
	5. Flagellates	455
	Other genera	3,696
	Total	7,186
09/21/73	1. *Dactylococcopsis sp.*	1,493
	2. *Anabaena sp.*	717
	3. *Raphidiopsis sp.*	418
	4. *Cyclotella sp.*	388
	5. Flagellates	358
	Other genera	1,523
	Total	4,897

2. Chlorophyll *a* -

Sampling Date	Station Number	Chlorophyll *a* (μg/l)
03/30/73	1	3.9
	2	6.2
	3	2.6
	4	2.3

Sampling Date	Station Number	Chlorophyll a (µg/l)
07/06/73	1	8.8
	2	10.4
	3	6.5
	4	10.6
09/21/73	1	12.4
	2	10.9
	3	16.5
	4	9.8

C. Limiting Nutrient Study:

There was a significant loss of nutrients in the assay sample from the time the sample was collected to the time the assay was begun. Therefore, the results are not considered representative of conditions in the lake at the time the sample was taken (03/30/73).

However, the lake data indicate phosphorus limitation in March and July (the mean inorganic nitrogen/orthophosphorus ratios were 14/1 both times) and nitrogen limitation in September (the mean N/P ratio was 11/1).

IV. NUTRIENT LOADINGS
(See Appendix E for data)

For the determination of nutrient loadings, the South Carolina National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff month of January when two samples were collected. Sampling was begun in February, 1973, and was completed in February, 1974.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the South Carolina District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*. Nutrient loads shown are those measured minus point-source loads, if any.

Nutrient loads for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the means of the nutrient loads, in $kg/km^2/year$, at stations B-1, C-1, D-1, and F-1 and multiplying the means by the ZZ area in km^2.

The operator of the Winnsboro wastewater treatment plant provided monthly effluent samples and estimated flows. The operators of the other listed municipal plants did not participate in the Survey, and the nutrient loads in treated wastes were estimated at 1.134 kg P and 3.401 kg N/capita/year. The nutrient loads in the untreated wastes

* See Working Paper No. 175.

of Great Falls were estimated at 1.587 kg P and 4.263 kg N/capita/year.

The indirect municipal point-source loads leaving upstream Fishing Creek Reservoir* were calculated by multiplying the nutrient loads leaving the reservoir (662,045 kg P and 6,736,480 kg N) by the fractions of the total nutrient loads contributed by the municipal point sources (0.744 for P and 0.240 for N).

A. Waste Sources**:

1. Known municipal -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
Chester	1,000	tr. filter	832.7	Trib./Rocky Creek
Great Falls (2)	3,000	none	3,709.3	Rocky Creek & Catawba River
Ridgeway #1	130	septic tank	49.2	Trib./Dutchmans Creek
Rock Hill	1,000	ext. aer.	1,714.6	Wildcat Creek/ Fishing Creek
Winnsboro	1,824	aer. pond	567.8	McCulley Creek
York #1	2,200	tr. filter	1,892.5	Fishing Creek

In addition, there are 15 privately-owned domestic treatment facilities in the Wateree Lake drainage (combined flow of 1,360 m^3/day). The nutrient impact of these small facilities is not known but probably is relatively insignificant.

2. Indirect municipal--Thirteen municipal wastewater treatment plants discharge in the drainage of upstream Fishing Creek Reservoir, and indirect municipal sources in the Lake Wylie*** drainage

* Working Paper No. 430.
** King, 1974; Foley, 1976.
*** Working Paper No. 441.

also impact the reservoir. A portion of these municipal loads reaches Wateree Lake via the reservoir outlet and the Catawba River.

3. Known industrial--Three industrial waste treatment plants with a combined flow of 863 m^3/day discharge in the Wateree Lake drainage. The nutrient contributions of these sources are not known but probably are relatively small.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr	% of total
a. Tributaries (non-point load) -		
Catawba River	96,665	15.7
White Oak Creek	320	<0.1
Beaver Creek	975	0.2
Cedar Creek	2,250	0.4
Big Wateree Creek	4,555	0.7
Little Wateree Creek	620	0.1
Dutchmans Creek	625	0.1
b. Minor tributaries & immediate drainage (non-point load) -	6,580	1.1
c. Known municipal STP's -		
Chester	1,135	0.2
Great Falls	4,760	0.8
Ridgeway #1	145	<0.1
Rock Hill	1,135	0.2
Winnsboro	1,730	0.3
York #1	2,495	0.4
Indirect sources	492,560	79.7
d. Septic tanks - Unknown	?	-
e. Known industrial - Probably insignificant		-
f. Direct precipitation* -	970	0.2
Total	617,520	100.0

2. Outputs -

Lake outlet - Wateree River 462,785

3. Net annual P accumulation - 154,735 kg.

* See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/ yr	% of total
a. Tributaries (non-point load) -		
Catawba River	2,232,795	54.3
White Oak Creek	4,775	0.1
Beaver Creek	17,220	0.4
Cedar Creek	18,650	0.5
Big Wateree Creek	23,055	0.6
Little Wateree Creek	37,135	0.9
Dutchmans Creek	10,750	0.3
b. Minor tributaries & immediate drainage (non-point load) -	59,130	1.4
c. Known municipal STP's -		
Chester	3,400	<0.1
Great Falls	12,790	0.3
Ridgeway #1	440	<0.1
Rock Hill	3,400	<0.1
Winnsboro	2,290	<0.1
York #1	7,480	0.2
Indirect sources	1,616,755	39.3
d. Septic tanks - Unknown	?	-
e. Known industrial - Probably insignificant		-
f. Direct precipitation* -	59,895	1.5
Total	4,109,960	100.0

2. Outputs -

Lake outlet - Wateree River 4,512,345

3. Net annual N loss - 402,385 kg.

* See Working Paper No. 175.

D. Mean Annual Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km^2/yr	kg N/km^2/yr
Catawba River	9	198
White Oak Creek	9	142
Beaver Creek	10	169
Cedar Creek	27	224
Big Wateree Creek	31	157
Little Wateree Creek	4	210
Dutchmans Creek	9	152

E. Yearly Loads:

In the following table, the existing phosphorus loadings are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Essentially, his "dangerous" loading is one at which the receiving water would become eutrophic or remain eutrophic; his "permissible" loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic loading would be considered one between "dangerous" and "permissible".

Note that Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m²/yr	11.13	2.79	74.1	loss*

Vollenweider phosphorus loadings ($g/m^2/yr$) based on mean depth and mean hydraulic retention time of Wateree Lake:	
"Dangerous" (eutrophic loading)	1.82
"Permissible" (oligotrophic loading)	0.91

* There was an apparent loss of nitrogen during the sampling year. This may have been due to nitrogen fixation in the lake, solubilization of previously sedimented nitrogen, recharge with nitrogen-rich ground water, unsampled point sources discharging directly to the lake, or (probably) insufficient outlet sampling in relation to the relatively short hydraulic retention time of the lake. Whatever the cause, a similar nitrogen loss has occurred at Shagawa Lake, Minnesota, which has been intensively studied by EPA's former National Eutrophication and Lake Restoration Branch (Malueg et al., 1975).

V. LITERATURE REVIEWED

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VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
4503	FISHING CREEK RESERVOIR	0.143	0.535	483.000	2.811	10.200	0.051
4504	LAKE GREENWOOD	0.061	0.470	463.917	8.150	15.000	0.011
4505	LAKE HARTWELL	0.013	0.130	422.000	6.157	15.000	0.004
4506	LAKE MARION	0.055	0.280	470.176	8.728	14.900	0.010
4507	LAKE MURRAY	0.024	0.260	424.905	6.478	15.000	0.007
4508	LAKE ROBINSON	0.014	0.260	458.778	8.611	14.000	0.005
4510	LAKE WATEREE	0.094	0.450	475.667	8.408	14.100	0.034
4511	LAKE WYLIE	0.045	0.380	462.222	5.422	14.800	0.013
4512	LAKE MOULTRIE	0.026	0.200	455.36[illegible]	8.800	11.200	0.006
4513	LAKE KEOWEE	0.008	0.170	371.750	2.833	15.000	0.003
4514	LAKE SECESSION	0.057	0.355	462.778	10.722	15.000	0.006
4515	SALUDA LAKE	0.046	0.230	476.833	1.517	10.800	0.006
4516	LAKE WILLIAM C. BOWEN	0.022	0.360	459.889	3.911	15.000	0.007

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
4503	FISHING CREEK RESERVOIR	0 (0)	0 (0)	0 (0)	92 (11)	100 (12)	0 (0)	192
4504	LAKE GREENWOOD	17 (2)	8 (1)	33 (4)	42 (5)	21 (0)	25 (3)	146
4505	LAKE HARTWELL	92 (11)	100 (12)	92 (11)	58 (7)	21 (0)	92 (11)	455
4506	LAKE MARION	33 (4)	50 (6)	25 (3)	17 (2)	50 (6)	33 (4)	208
4507	LAKE MURRAY	67 (8)	62 (7)	83 (10)	50 (6)	21 (0)	46 (5)	329
4508	LAKE ROBINSON	83 (10)	62 (7)	67 (8)	25 (3)	75 (9)	83 (10)	395
4510	LAKE WATEREE	8 (1)	17 (2)	17 (2)	33 (4)	67 (8)	8 (1)	150
4511	LAKE WYLIE	50 (6)	25 (3)	50 (6)	67 (8)	58 (7)	17 (2)	267
4512	LAKE MOULTRIE	58 (7)	83 (10)	75 (9)	8 (1)	83 (10)	71 (8)	378
4513	LAKE KEOWEE	100 (12)	92 (11)	100 (12)	83 (10)	21 (0)	100 (12)	496
4514	LAKE SECESSION	25 (3)	42 (5)	42 (5)	0 (0)	21 (0)	58 (7)	188
4515	SALUDA LAKE	42 (5)	75 (9)	8 (1)	100 (12)	92 (11)	71 (8)	388
4516	LAKE WILLIAM C. BOWEN	75 (9)	33 (4)	58 (7)	75 (9)	21 (0)	46 (5)	308

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	4513	LAKE KEOWEE	496
2	4505	LAKE HARTWELL	455
3	4508	LAKE ROBINSON	395
4	4515	SALUDA LAKE	388
5	4512	LAKE MOULTRIE	378
6	4507	LAKE MURRAY	329
7	4516	LAKE WILLIAM C. BOWEN	308
8	4511	LAKE WYLIE	267
9	4506	LAKE MARION	208
10	4503	FISHING CREEK RESERVOIR	192
11	4514	LAKE SECESSION	188
12	4510	LAKE WATEREE	150
13	4504	LAKE GREENWOOD	146

APPENDIX B

CONVERSION FACTORS

22<
TS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR SOUTH CAROLINA 04/27/76

LAKE CODE 4510 WATEREE LAKE

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 12302.5

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
4510A1	12302.5	210.96	227.38	239.56	232.76	147.53	135.35	113.27	119.50	124.88	123.46	129.97	138.75	161.48
4510B1	33.7	0.57	0.76	0.85	0.57	0.23	0.17	0.25	0.25	0.17	0.20	0.25	0.34	0.38
4510C1	101.8	1.76	2.32	2.61	1.70	0.71	0.54	0.74	0.74	0.51	0.59	0.76	1.05	1.16
4510D1	83.1	1.44	1.90	2.12	1.39	0.57	0.42	0.59	0.59	0.42	0.48	0.62	0.85	0.95
4510E1	11292.4	197.37	221.15	233.61	212.09	134.22	117.80	108.74	110.44	108.74	107.04	123.18	134.22	150.25
4510F1	146.9	2.52	3.34	3.74	2.46	1.02	0.76	1.05	1.08	0.74	0.88	1.10	1.53	1.68
4510G1	176.6	3.03	4.02	4.50	2.97	1.22	0.93	1.27	1.30	0.91	1.05	1.33	1.81	2.02
4510H1	70.7	1.22	1.61	1.81	1.19	0.48	0.37	0.51	0.51	0.37	0.42	0.54	0.74	0.81
4510ZZ	341.9	5.89	7.76	8.72	5.75	2.35	1.78	2.44	2.49	1.76	2.04	2.58	3.54	3.90

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 12302.5
SUM OF SUB-DRAINAGE AREAS = 12247.1

TOTAL FLOW IN = 1940.06
TOTAL FLOW OUT = 1943.38

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4510A1	2	73	365.287	25	38.228				
	3	73	396.436	18	447.406				
	4	73	450.238	23	18.689				
	5	73	220.588	20	9.911				
	6	73	328.475	17	322.812				
	7	73	155.176	15	119.214				
	8	73	132.806	16	110.436				
	9	73	143.850	14	230.499				
	10	73	83.818	14	32.281				
	11	73	84.951	18	50.470				
	12	73	150.079	15	214.925				
	1	74	252.020	5	382.277	19	175.564		
	2	74	311.485	2	269.010				
4510B1	2	73	1.048	25	0.623				
	3	73	0.566	18	1.642				
	4	73	2.209	23	0.227				
	5	73	0.113	20	0.170				
	6	73	0.906	17	0.821				
	7	73	0.283	15	0.113				
	8	73	0.283	16	0.085				
	9	73	0.283	14	1.841				
	10	73	0.255	14	0.113				
	11	73	0.113	18	0.085				
	12	73	0.283	15	0.198				
	1	74	0.736	5	0.453	19	0.283		
	2	74	0.991	2	0.906				

TRIBUTARY FLOW INFORMATION FOR SOUTH CAROLINA 04/27/76

LAKE CODE 4510 WATEREE LAKE

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4510C1	2	73	3.220	25	1.897				
	3	73	1.841	18	4.955				
	4	73	6.683	23	0.680				
	5	73	0.368	20	0.566				
	6	73	2.775	17	2.492				
	7	73	0.396	15	0.340				
	8	73	0.311	16	0.227				
	9	73	1.133	14	5.550				
	10	73	0.793	14	0.340				
	11	73	0.340	18	0.283				
	12	73	0.821	15	0.566				
	1	74	2.237	5	1.388	19	0.821		
	2	74	3.002	2	2.775				
4510D1	2	73	2.633	25	1.557				
	3	73	1.557	18	4.106				
	4	73	5.380	23	0.530				
	5	73	0.311	20	0.453				
	6	73	2.265	17	2.039				
	7	73	0.368	15	0.283				
	8	73	0.311	16	0.170				
	9	73	0.850	14	4.531				
	10	73	0.623	14	0.283				
	11	73	0.283	18	0.227				
	12	73	0.680	15	0.453				
	1	74	1.812	5	1.133	19	0.680		
	2	74	2.464	2	2.265				
4510E1	2	73	334.139	25	20.530				
	3	73	373.782	18	705.089				
	4	73	393.604	23	67.960				
	5	73	229.650	20	23.078				
	6	73	294.495	17	282.319				
	7	73	160.840	15	170.467				
	8	73	144.416	16	89.481				
	9	73	138.753	14	197.085				
	10	73	73.057	14	11.044				
	11	73	84.101	18	65.978				
	12	73	140.452	15	228.234				
	1	74	227.667	5	225.402	19	185.192		
	2	74	294.495	2	260.232				
4510F1	2	73	4.644	25	2.718				
	3	73	2.832	18	7.221				
	4	73	9.628	23	0.963				
	5	73	0.538	20	0.793				
	6	73	4.021	17	3.625				
	7	73	0.453	15	0.481				
	8	73	0.340	16	0.311				
	9	73	1.699	14	8.042				
	10	73	1.133	14	0.481				
	11	73	0.481	18	0.396				
	12	73	1.218	15	0.793				
	1	74	3.200	5	1.982	19	1.218		
	2	74	4.332	2	4.021				

TRIBUTARY FLOW INFORMATION FOR SOUTH CAROLINA 04/27/76

LAKE CODE 4510 WATEREE LAKE

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS) 26<

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4510G1	2	73	5.607	25	3.256				
	3	73	3.256	18	8.693				
	4	73	11.327	23	1.161				
	5	73	0.651	20	0.963				
	6	73	4.814	17	4.332				
	7	73	0.481	15	0.566				
	8	73	0.340	16	0.396				
	9	73	1.982	14	9.628				
	10	73	1.359	14	0.566				
	11	73	0.566	18	0.481				
	12	73	1.444	15	0.991				
	1	74	3.851	5	2.407	19	1.444		
	2	74	5.210	2	4.814				
4510H1	2	73	2.237	25	1.303				
	3	73	1.274	18	3.483				
	4	73	4.616	23	0.453				
	5	73	0.255	20	0.396				
	6	73	1.926	17	1.727				
	7	73	0.368	15	0.227				
	8	73	0.283	16	0.142				
	9	73	0.850	14	3.823				
	10	73	0.538	14	0.227				
	11	73	0.227	18	0.198				
	12	73	0.566	15	0.425				
	1	74	1.557	5	0.963	19	0.566		
	2	74	2.095	2	1.926				
4510ZZ	2	73	10.817	25	6.230				
	3	73	6.513	18	16.707				
	4	73	22.370	23	2.237				
	5	73	1.246	20	1.869				
	6	73	9.345	17	8.410				
	7	73	0.368	15	1.133				
	8	73	0.396	16	0.736				
	9	73	3.681	14	18.689				
	10	73	2.605	14	1.133				
	11	73	1.133	18	0.934				
	12	73	2.803	15	1.841				
	1	74	7.476	5	4.672	19	2.832		
	2	74	10.081	2	9.345				

APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 76/04/27

28<

451001
34 20 20.0 080 42 03.0 3
LAKE WATEREE
45055 SOUTH CAROLINA
030092

11EPALES 2111202
0064 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/03/30	12 50	0000	15.1		18	98	7.20	17	0.180	0.700	0.380	0.042
	12 50	0006	14.5	8.2		100	7.20	16	0.160	0.300	0.380	0.039
	12 50	0015	14.5	8.6		98	7.20	16	0.160	0.400	0.370	0.039
	12 50	0027	14.4	8.2		98	7.20	16	0.170	0.400	0.380	0.042
	12 50	0040	14.4	8.4		98	7.10	15	0.170	0.400	0.380	0.037
	12 50	0050	14.3	8.0		95	7.10	15	0.180	0.500	0.380	0.036
	12 50	0060	14.2	7.6		100	7.00	15	0.190	0.600	0.380	0.034
73/07/06	14 00	0000	30.0		36	98	9.20	19	0.090	0.800	0.070	0.008
	14 00	0006	30.5	9.5		85	8.50	15	0.070	0.500	0.070	0.010
	14 00	0015	27.2	3.6		92	6.70	18	0.090	0.500	0.150	0.017
	14 00	0030	25.7	2.5		98	6.60	16	0.280	0.400	0.290	0.036
	14 00	0048	25.0	1.3		89	6.50	17	0.420	0.600	0.240	0.032
	14 00	0064	23.5	0.9		89	6.60	20	0.480	0.800	0.220	0.032
73/09/21	14 15	0000	27.8	5.8	37	113	6.70	19	0.150	1.000	0.130	0.018
	14 15	0015	27.1	4.4		111	6.60	19	0.140	0.600	0.120	0.019
	14 15	0030	27.1	3.8		111	6.70	18	0.150	0.600	0.120	0.021
	14 15	0045	26.9	1.8		109	6.60	18	0.250	0.700	0.190	0.027
	14 15	0060	26.7	2.2		108	6.60	17	0.250	0.800	0.180	0.026

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/03/30	12 50	0000	0.098	3.9
	12 50	0006	0.096	
	12 50	0015	0.092	
	12 50	0027	0.101	
	12 50	0040	0.109	
	12 50	0050	0.103	
	12 50	0060	0.103	
73/07/06	14 00	0000	0.067	8.8
	14 00	0006	0.056	
	14 00	0015	0.045	
	14 00	0030	0.083	
	14 00	0048	0.111	
	14 00	0064	0.125	
73/09/21	14 15	0000	0.039	12.4
	14 15	0015	0.037	
	14 15	0030	0.032	
	14 15	0045	0.047	
	14 15	0060	0.051	

STORET RETRIEVAL DATE 76/04/27

29<

451002
34 22 30.0 080 46 15.0 3
LAKE WATEREE
45055 SOUTH CAROLINA
030891

11EPALES 2111202
0034 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/03/30	13 35	0000	14.6		15	90	7.20	33	0.170	0.800	0.470	0.043
	13 35	0006	14.5	8.6		90	7.20	17	0.160	0.400	0.390	0.041
	13 35	0015	14.5	8.4		90	7.20	16	0.160	0.400	0.390	0.040
	13 35	0025	14.5	8.4		90	7.20	17	0.160	0.400	0.390	0.039
73/07/06	14 35	0000	30.9		36	100	9.10	21	0.090	0.500	0.080	0.007
	14 35	0006	29.5	7.8		98	7.70	21	0.060	0.400	0.080	0.009
	14 35	0015	27.5	3.8		100	6.60	24	0.310	0.600	0.260	0.030
	14 35	0030	25.2	1.3		91	7.00	19	0.140	0.500	0.160	0.018
73/09/21	16 05	0000	27.4	9.2	36	111	9.00	17	0.070	1.600	0.040	0.015
	16 05	0015	26.0	5.0		108	7.50	18	0.140	0.700	0.130	0.026
	16 05	0026	26.4	4.2		108	7.00	21	0.170	0.600	0.130	0.026

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/03/30	13 35	0000	0.121	6.2
	13 35	0006	0.110	
	13 35	0015	0.122	
	13 35	0025	0.112	
73/07/06	14 35	0000	0.071	10.4
	14 35	0006	0.061	
	14 35	0015	0.113	
	14 35	0030	0.058	
73/09/21	16 05	0000	0.043	10.9
	16 05	0015	0.038	
	16 05	0026	0.045	

STORET RETRIEVAL DATE 76/04/27

30<

451003
34 25 25.0 080 50 30.0 3
LAKE WATEREE
45039 SOUTH CAROLINA

030891

11EPALES 2111202
0022 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/03/31	10 45	0000	14.7		12	90	7.20	10K	0.160	0.600	0.360	0.038
	10 45	0006	14.1	8.8		90	7.30	17	0.160	0.300	0.390	0.038
	10 45	0012	14.1	8.0		90	7.30	16	0.170	0.500	0.400	0.042
	10 45	0018	14.1	8.0		90	7.30	35	0.190	0.400	0.480	0.041
73/07/06	15 00	0000	30.2		30	110	8.10	24	0.070	0.300	0.160	0.025
	15 00	0006	28.4	8.5		102	7.70	20	0.080	0.200	0.160	0.028
	15 00	0015	27.9	5.5		108	6.90	23	0.170	0.300	0.280	0.034
	15 00	0020	27.0	3.6		105	6.80	25	0.170	0.500	0.210	0.021
73/09/21	16 35	0000	27.4	8.8	30	104	7.30	21	0.060	1.100	0.190	0.032
	16 35	0010	26.0	5.4		101	6.90	22	0.120	0.700	0.180	0.034
	16 35	0013	25.9			100						
	16 35	0020	25.8	5.2		100	6.90	23	0.170	0.700	0.220	0.038

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/03/31	10 45	0000	0.111	2.6
	10 45	0006	0.124	
	10 45	0012	0.119	
	10 45	0018	0.127	
73/07/06	15 00	0000	0.088	6.5
	15 00	0006	0.088	
	15 00	0015	0.077	
	15 00	0020	0.094	
73/09/21	16 35	0000	0.144	16.5
	16 35	0010	0.066	
	16 35	0020	0.075	

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/04/27

451004
34 31 35.0 080 52 00.0 3
LAKE WATEREE
45039 SOUTH CAROLINA
030891

11EPALES 2111202
0010 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/03/30	11 20	0000	13.4		12	90	7.30	10K	0.150	0.500	0.370	0.042
	11 20	0006	13.4	11.0		90	7.20	10K	0.160	0.300	0.380	0.042
73/07/06	15 30	0000	28.4		12	110	6.90	23	0.160	0.500	0.310	0.047
	15 30	0005	28.4	6.1		110	6.90	24	0.150	0.200	0.330	0.044
	15 30	0009	28.4	6.2		110	6.90	23	0.130	0.200	0.310	0.041
73/09/21	10 00	0000	26.3	7.2	18	100	6.80	20	0.140	0.900	0.230	0.052
	10 00	0010	26.0	6.0		100	6.70	21	0.130	0.600	0.220	0.047

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/03/30	11 20	0000	0.126	2.3
	11 20	0006	0.128	
73/07/06	15 30	0000	0.117	10.6
	15 30	0005	0.113	
	15 30	0009	0.099	
73/09/21	10 00	0000	0.076	9.8
	10 00	0010	0.069	

K VALUE KNOWN TO BE
LESS THAN INDICATED

APPENDIX E

TRIBUTARY and WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 76/04/27

4510A1
34 20 00.0 080 42 00.0 4
WATEREE RIVER
45 KERSHAW CO HWY M
O/WATEREE LAKE 030892
BANK .25 BELO DAM AT END OF RD
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/02/25	08 52		0.290	0.440	0.154	0.060	0.125
73/03/18	08 10		0.273	0.480	0.063	0.042	0.100
73/04/23	14 45		0.260	0.630	0.110	0.052	0.110
73/05/20	09 45		0.210	0.560	0.220	0.046	0.080
73/06/17	09 20		0.210	0.980	0.120	0.035	0.085
73/07/15	18 50		0.200	1.200	0.277	0.053	0.105
73/08/16	11 30		0.075	0.610	0.095	0.011	0.060
73/09/14	08 47		0.031	0.820	0.150	0.005K	0.055
73/10/14	16 00		0.138	0.450	0.170	0.021	0.067
73/11/18	09 00		0.168	0.450	0.076	0.016	0.055
73/12/15	08 49		0.352	0.400	0.116	0.040	0.080
74/01/05	09 05		0.370	0.800	0.176	0.080	0.120
74/01/19	10 15		0.370	0.400	0.116	0.060	0.130
74/02/02	09 25		0.440	0.900	0.108	0.060	0.115

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/04/27

451081
34 23 30.0 080 44 00.0 4
WHITE OAK CREEK
45 KERSHAW CO HWY M
T/WATEREE LAKE 030892
ST HWY 97 BRDG 10 MI NW OF CAMDEN
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/02/25	12 30		0.075	0.100K	0.037	0.010	0.020
73/03/18	10 30		0.046	0.200	0.012	0.012	0.025
73/04/23	17 15		0.042	0.190	0.005K	0.006	0.020
73/05/20	11 00		0.140	0.560	0.038	0.012	0.027
73/06/17	11 51		0.100	0.400	0.042	0.008	0.038
73/07/15	11 38		0.132	0.190	0.028	0.017	0.030
73/08/16	14 45		0.132	0.210	0.018	0.007	0.020
73/09/14	11 40		0.091	0.330	0.032	0.010	0.035
73/10/14	14 00		0.078	1.450	0.042	0.009	0.025
73/11/18	11 32		0.017	0.100K	0.014	0.008	0.020
73/12/15	11 35		0.068	0.100K	0.028	0.012	0.020
74/01/05	10 52		0.096	0.200	0.028	0.016	0.030
74/01/19	12 50		0.124	0.100	0.028	0.008	0.030
74/02/02	12 25		0.120	0.100K	0.020	0.015	0.030

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/04/27

35<

4510C1
34 27 30.0 080 46 00.0 4
BEAVER CREEK
45 KERSHAW CO HWY M
T/WATEREE RIVER 030891
ST HWY 13 BRDG 18 MI NW OF CAMDEN
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/02/25	12 00		0.080	0.120	0.050	0.008	0.015
73/03/18	10 00		0.046	1.100	0.044	0.009	0.025
73/04/23	17 00		0.038	0.180	0.007	0.006	0.020
73/05/20	10 05		0.120	0.280	0.042	0.011	0.025
73/06/17	11 35		0.086	1.500	0.046	0.019	0.035
73/07/15	11 20		0.018	0.170	0.033	0.010	0.015
73/08/16	14 20		0.138	0.100K	0.016	0.005K	0.015
73/09/14	11 22		0.078	0.400	0.037	0.010	0.050
73/10/14	14 16		0.013	0.300	0.032	0.005K	0.025
73/11/18	11 14		0.012	0.100K	0.020	0.008	0.010
73/12/15	11 15		0.056	0.300	0.028	0.008	0.025
74/01/05	10 40		0.032	0.400	0.032	0.016	0.045
74/01/19	12 25		0.010K	0.100	0.016	0.005K	0.020
74/02/02	12 00		0.100	0.600	0.055	0.015	0.040

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/04/27

4510D1
34 32 25.0 080 52 00.0 4
CEDAR CREEK
45 LANCASTER CO HWY
T/WATEREE LAKE 030891
BANK ABOV BOAT RAMP,BELO CONFLUENCE
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/02/25	11	20	0.069	0.100K	0.058	0.009	0.015
73/03/18	09	40	0.046	1.050	0.049	0.013	0.035
73/04/23	16	35	0.093	0.295	0.023	0.020	0.060
73/05/20	09	40	0.120	0.480	0.018	0.012	0.075
73/06/17	11	07	0.092	1.150	0.025	0.020	0.050
73/07/15	11	00	0.280	0.640	0.115	0.054	0.115
73/08/16	13	40	0.160	0.170	0.033	0.020	0.040
73/09/14	10	53	0.072	0.800	0.121	0.017	0.080
73/10/14	14	37	0.058	0.350	0.029	0.009	0.025
73/11/18	10	39	0.016	0.100K	0.016	0.008	0.030
73/12/15	10	31	0.340	0.550	0.136	0.088	0.178
74/01/05	10	10	0.336	0.600	0.132	0.080	0.190
74/01/19	12	05	0.080	0.100K	0.030	0.008	0.035
74/02/02	11	25	0.080	0.400	0.080	0.020	0.110

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/04/27

37<

4510E1
34 32 30.0 080 52 30.0 4
CATAWBA RIVER
45 LANCASTER CO HWY
I/WATEREE LAKE 030891
BANK BELO ROCK&CEDAR CREEKS POWER PLANTS
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/02/25	11	15	0.300	0.480	0.132	0.069	0.150
73/03/18	09	30	0.050	0.580	0.024	0.034	0.155
73/04/23	16	40	0.044	0.190	0.015	0.009	0.025
73/05/20	09	38	0.270	0.960	0.096	0.050	0.105
73/06/17	11	00	0.330	1.600	0.126	0.064	0.165
73/07/15	10	55	0.100	0.100K	0.019	0.021	0.021
73/08/16	13	55	0.315	0.540	0.105	0.072	0.155
73/09/14	10	48	0.198	0.560	0.105	0.060	0.145
73/10/14	14	33	0.240	0.400	0.095	0.061	0.120
73/11/18	10	37	0.380	0.700	0.124	0.104	0.185
73/12/15	10	40	0.068	0.100	0.024	0.012	0.035
74/01/05	10	15	0.340	0.600	0.136	0.084	0.190
74/01/19	12	00	0.470	0.600	0.140	0.080	0.185
74/02/02	11	25	0.440	0.600	0.145	0.065	0.155

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/04/27

4S10F1
34 28 00.0 080 56 30.0 4
BIG WATEREE CREEK
4S FAIRFIELD CO HWY
T/WATEREE LAKE 030891
US HWY 21 BROG 13 MI ENE OF WINNSBORO
11EPALES 2111204
. 0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/02/25	10 25		0.054	0.160	0.054	0.022	0.040
73/03/18	07 40		0.078	0.560	0.019	0.020	0.120
73/04/23	16 10		0.012	0.190	0.008	0.010	0.025
73/05/20	09 50		0.130	0.260	0.014	0.012	0.075
73/06/17	10 28		0.056	0.960	0.050	0.066	0.145
73/07/15	10 11		0.023	0.270	0.027	0.009	0.025
73/08/16	12 50		0.066	0.205	0.031	0.013	0.025
73/09/14	10 07		0.066	1.050	0.092	0.052	0.300
73/10/14	15 15		0.025	0.100K	0.028	0.036	0.036
73/11/18	09 49		0.012	0.100K	0.020	0.020	0.022
73/12/15	10 05		0.032	0.400	0.020	0.036	0.095
74/01/05	09 55		0.048	0.400	0.032	0.040	0.105
74/01/19	11 15		0.064	0.300	0.032	0.020	0.050
74/02/02	10 50		0.080	0.300	0.030	0.040	0.120

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/04/27

39<

4510G1
34 26 00.0 080 56 30.0 4
LITTLE WATEREE CREEK
45 FAIRFIELD CO HWY
T/WATEREE LAKE 030891
US HWY 21 BRDG 12 ENE OF WINNSBORO
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/02/25	10	10	0.147	0.160	0.060	0.013	0.020
73/03/18	07	35	0.020	0.330	0.009	0.013	0.040
73/04/23	15	55	0.126	0.180	0.005K	0.005K	0.015
73/05/20	09	10	0.350	0.230	0.026	0.009	0.020
73/06/17	10	20	0.066	1.700	0.090	0.066	0.098
73/07/15	10	03	0.200	0.850	0.044	0.008	0.015
73/08/16	12	45	0.189	0.200	0.020	0.005K	0.010
73/09/14	10	02	0.067	0.850	0.154	0.027	0.100
73/10/14	15	20	0.105	0.150	0.042	0.005K	0.015
73/11/18	09	45	0.012	0.200	0.016	0.005K	0.005K
73/12/15	10	00	0.088	0.500	0.020	0.012	0.045
74/01/05	09	45	0.068	0.250	0.032	0.024	0.052
74/01/19	11	10	0.160	0.700	0.044	0.008	0.025
74/02/02	10	45	0.104	0.500	0.035	0.020	0.045

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/04/27

4510H1
34 23 00.0 080 55 30.0 4
DUTCHMANS CREEK
45 FAIRFIELD CO HWY
T/WATEREE LAKE 030891
UNIMPROVED RD FORD 6 MI N OF RIDGEWAY
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/02/25	09	45	0.032	0.120	0.032	0.010	0.015
73/03/18	07	15	0.252	0.155	0.056		0.050
73/04/23	15	30	0.010K	0.180	0.005K	0.005K	0.015
73/05/20	08	00	0.069	0.190	0.014	0.005K	0.015
73/06/17	11	00	0.040	1.400	0.058	0.035	0.050
73/07/15	09	36	0.054	0.340	0.105	0.009	0.025
73/08/16	12	15	0.056	0.120	0.019	0.005K	0.015
73/09/14	09	40	0.019	0.820	0.099	0.015	0.050
73/10/14	15	37	0.015	0.600	0.046	0.005K	0.025
73/11/18	09	30	0.010K	0.100K	0.012	0.008	0.008
73/12/15	09	40	0.007	0.500	0.024	0.014	0.045
74/01/19	10	47	0.032	0.200	0.028	0.008	0.030
74/02/02	10	15	0.084	0.200	0.025	0.025	0.040

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/04/27

41<

4510XA AP4510XA P001824
34 23 20.0 081 03 55.0 4
WINNSBORO
45 FAIRFIELD CO HWY
T/LAKE WATEREE 030891
MCCULLY CREEK/LITTLE WATEREE CREEK
11EPALES 2141204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/06/12 CP(T)- 73/06/12	11 00 16 00		1.540	6.500	0.240	5.800	7.350	0.150	0.150
73/07/12 CP(T)- 73/07/12	11 00 16 00		0.037	7.400	0.550	4.900	5.800	0.150	0.150
73/08/15 CP(T)- 73/08/15	10 00 15 00		0.150	11.500	0.650	3.150	8.000	0.150	0.150
73/09/12 CP(T)- 73/09/12	11 00 16 00		1.540	7.800	0.430	8.130	8.700	0.150	0.150
73/10/12 CP(T)- 73/10/12	11 00 16 00		1.470	6.300	0.088	8.590	9.400	0.150	0.150
73/11/12	10 00		2.200	8.700	0.187	8.850	9.800	0.150	0.150
73/12/12 CP(T)- 73/12/12	10 00 15 00		0.130	10.000	4.700	10.100	10.100	0.150	0.150
74/01/11 CP(T)- 74/01/11	10 00 15 00		0.120	15.000	6.900	6.950	7.900	0.150	0.150
74/02/12 CP(T)- 74/02/12	10 00 15 00		0.400	12.000	5.200	5.800	6.400	0.150	0.150
74/03/12 CP(T)- 74/03/12	10 00 15 00		0.040	14.000			8.400	0.150	0.150
74/04/12 CP(T)- 74/04/12	11 00 16 00		1.320	15.000	2.900	6.600	8.900	0.150	0.150
74/05/13 CP(T)- 74/05/13	10 00 15 00		4.300	6.700	0.180	7.600	9.200	0.150	0.150
74/06/07	13 00		3.000	6.400	0.350	6.200	8.400	0.150	0.150